Complementary medicine: state of the evidence

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The term complementary medicine embraces a wide range of diverse therapies and diagnostic methods. Previous terms have included fringe medicine, unconventional medicine, unorthodox medicine, natural medicine and, the most widely used, alternative medicine. Complementary medicine (CM) is now the preferred description as practitioners of these therapies now see them as supplementing rather than replacing orthodox medicine. A high proportion of patients of doctors and other healthcare professionals attend complementary practitioners or self-administer complementary remedies, often without the knowledge of their doctor[1]. The purpose of this paper is to present a broad overview of research on complementary medicine, with special attention to studies of efficacy of the major therapies and to potential adverse effects, so that clinicians may make informed decisions when discussing such issues with their patients. In addition the field offers many fascinating and important opportunities for research on such issues as the evaluation of complementary treatments—in particular, the assessment of non-specific placebo factors, the reasons for seeking complementary therapy, the role of beliefs about health and medicine, and the relationship between patients and complementary practitioners.

THE MAJOR COMPLEMENTARY THERAPIES

A British Medical Association report (1986)[2] listed 116 different types of complementary therapy and diagnostic aid. Their history, philosophy and methods are notably diverse. The origins of some, for example acupuncture, are ancient while osteopathy and homoeopathy date from the 19th century. Some (acupuncture, homoeopathy) are complete systems of medicine, while others are restricted to diagnosis alone (iridology) or to a specific therapeutic technique (massage). The range of treatments is equally diverse—diet, plant remedies, needles, minuscule homoeopathy doses, mineral and vitamin supplements and various psychological techniques[3]. The theoretical frameworks and underlying philosophy differ in coherence, complexity, and the degree to which they could be incorporated in current scientific medicine. Complementary practitioners vary enormously in their attitude to orthodox medicine, the extent of their training and their desire for professional recognition[4]. This overview will focus predominantly on the major systems of CM that offer distinct approaches to the diagnosis and treatment of a wide range of complaints and disorders. We have for reasons of space excluded naturopathy, an eclectic therapeutic approach which often makes use of the other major systems.

The major therapies are shown in Box 1. Each of these therapies is associated with a coherent and systematic theory of the functioning of the body—which is not to say that the theories are necessarily correct or empirically founded. Although there is considerable variety they have some features in common. Most embrace the idea that the body and emotions are maintained by an underlying energy or vital force, a general all-encompassing theory of disease and a strong belief that the body is essentially self-healing. The task of the practitioner is to assist the healing process[5]. In addition to treating disease, complementary therapies aim to prevent illness by detecting and treating subtle signs of disease, in order to achieve an optimal state of physical and emotional health. Specific symptoms are seen as a manifestation of a general imbalance or dysfunction affecting the whole system, which is one sense in which CM is holistic. Many medical and lay practitioners reject some or all of the traditional theories yet still consider the technique to be useful[6]. Some acupuncturists, for example, diagnose in conventional terms and consider that acupuncture will eventually be satisfactorily explained in neurophysiological terms[7]. Generally such practitioners, sometimes referred to as medical acupuncturists, regard the scope of the therapy as more limited than the more traditionally oriented practitioners.

Complementary practitioners routinely enquire about emotional issues, lifestyle and other personal information. The emphasis on emotional factors may encourage an empathy and sensitivity in complementary practitioners which is probably an important part of their appeal. Being 'holistic' in this second sense refers more to the approach of the practitioner—meaning a clinician who is sensitive to psychological and social issues, non-authoritarian and so on[8]. According to this interpretation a surgeon might be holistic and an acupuncturist might not.

Practitioners of these therapies usually belong to professional associations, have undertaken formal training

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Box 1 **The major complementary therapies**

Acupuncture

The human body is considered to be an energy system. The acupuncturist influences this energy flow by inserting and manipulating needles along the meridians of energy; restoring the balance of the energy flow restores health and harmony to the individual

Herbalism

Plants have been used for medicinal purposes for at least 5000 years. Herbal remedies can provoke protective reactions within the body, stimulate the elimination of toxins and provide the body with a balance of nutrients and minerals. Herbalists consider that complex combinations of actual plant material are more effective than the specific isolated compounds used in modern pharmacology

Homoeopathy

The homoeopath stimulates the body's vital energies to prevent and treat disease. Diagnosis takes account of physical, emotional, mental and even moral factors. Homoeopathic remedies would produce symptoms that are similar to those being treated. They are frequently, but not always, diluted to the point where little if any of the original substance is left

Manipulative therapies: osteopathy and chiropractic

Osteopaths and chiropractors are skilled in the examination, treatment and interpretation of abnormalities of function of the musculoskeletal system. They hold that many common conditions are caused by, or at least aggravated by, misalignments or excessive strain placed on the vertebrae and other joints. They are primarily, but not exclusively, concerned with musculoskeletal disorders

and are often anxious to dissociate themselves from the wilder fringes of CM[1]. Although medical critics of CM can be vehement[9] many doctors are deeply interested in complementary therapies and considerable numbers have trained in one or more techniques[10–13]. A recent survey found that half the general practices in one UK health authority offered access to complementary therapy, usually provided by one of the doctors[14].

THE USE OF COMPLEMENTARY MEDICINE

Complementary therapies are widely used. In the United States Eisenberg *et al.*[15] found that 34% of Americans had used at least one unconventional therapy or remedy in the past year, and one-third of these people visited unconventional therapists. More visits were made to providers of unconventional therapy than to all US primary care physicians. The expenditure on unconventional therapies ($13.7 billion) was comparable to that on all hospital admissions in the US ($12.8 billion). Eisenberg *et al.* included vitamin and mineral supplements and relaxation techniques in their definition of unconventional therapy so these results exaggerate the use of truly complementary therapies.

In Europe surveys suggest that a third of people have seen a complementary therapist or used complementary remedies in any one year. The popularity of CM in Europe is growing rapidly. In 1981, 6.4% of the Dutch population attended a therapist or doctor providing CM, and this increased to 9.1% by 1985 and 15.7% in 1990. The use of homoeopathy, the most popular form of complementary therapy in France, rose from 16% of the population in 1982 to 29% in 1987 and 36% in 1992[16].

CM is generally used for chronic conditions such as musculoskeletal disorders, arthritis, respiratory disorders, skin conditions and psychological problems and sometimes for more serious conditions[1,17]. High rates of use of CM have been found in patients with AIDS[18,19], arthritis and rheumatism[20–22], asthma[23], irritable bowel syndrome[24] and cancer[25,26]. When unconventional therapies are used for serious conditions it is almost always as an adjunct to conventional treatment, rather than as a replacement for it. Doctors and other healthcare professionals will therefore see a great number of patients using unconventional treatments, most of which will probably not be discussed with them. There is little indication that patients using CM have turned their backs on orthodox medicine, although they may have exhausted its possibilities in relation to a specific complaint[1,17].

THE APPEAL OF COMPLEMENTARY MEDICINE

The principal reasons for embarking on CM are that it is more natural and allows a more active role for the patient and, secondly, the failure of orthodox medicine to provide relief for a specific complaint. The adverse effects of orthodox medicine and a more positive patient–practitioner relationship are also important for many patients[27].

Patients tend to be female, well educated and of higher than average social class. There is little to support the view that complementary patients are especially gullible or naïve, or have unusual personalities or value systems. However, comparisons of users and non-users of CM have brought preliminary evidence of different beliefs about health and disease. There is some evidence that they are more health conscious and believe more strongly that people can

influence their own state of health, both by lifestyle and through maintaining a psychological equilibrium. Complementary patients appear to have less faith in 'provider control'—that is, in the ability of medicine to resolve problems of ill health[4,28]. Some studies of cancer patients using CM have found that they were more likely to believe cancer was preventable through diet, stress reduction and environmental changes and to believe that patients should take an active role in their own health[29].

METHODOLOGICAL ISSUES IN CONTROLLED TRIALS OF COMPLEMENTARY MEDICINE

Complementary practitioners are often concerned that subjecting their therapy to the scrutiny of a randomized controlled trial (RCT) will distort the true purpose of what they are doing and disguise or negate the efficacy of their therapy. There have been suggestions that a different methodology is needed for the evaluation of these therapies[30]. Concerns about controlled trials are not, however, confined to CM. Especially with the extension of the methodology to assessments of non-drug treatments and interventions such as psychotherapy and health education, investigators have become increasingly aware of certain difficulties in the interpretation, feasibility and ethics of controlled trials. These difficulties include: (i) the blinding of subjects and/or clinicians not always being feasible; (ii) participation in the study affecting behaviour and outcome; (iii) non-representativeness of trial participants; (iv) artificially standardized treatments; (v) inadequate attention to individual responses; (vi) outcome measures that do not reflect the patient's concerns and (vii) various ethical issues[4,15,31–35].

CM is therefore not necessarily a special case requiring radically new methodologies. There are, however, several areas that pose particular difficulties. The major areas of concern are: (i) alternative theoretical frameworks, producing misunderstanding between conventional researchers and complementary practitioners; (ii) the use of unconventional diagnostic systems; (iii) problems with the blinding of trials; (iv) difficulties in defining an appropriate placebo control; (v) the insistence on individually tailored treatment and individual measures of response; and (vi) the difficulty in finding outcome measures that reflect the particular perspective of complementary practitioners. These issues are discussed in detail elsewhere[4], but two of particular importance are considered here.

Single-blind or double-blind trials?

The 'double-blind controlled trial' is the final arbiter of efficacy of a treatment. Within CM, herbalism and homoeopathy can be tested double-blind, in that the person giving the treatment could be left unaware of whether active preparations were given. This admittedly becomes quite complex if the treatment is adjusted during the trial, especially if the substances concerned cannot be easily disguised in a casing. But for treatments requiring the active participation of a practitioner, such as acupuncture, osteopathy, chiropractic, physiotherapy or surgery, no such manoeuvres are possible. The clinician cannot be blind to the treatment, though the patient can be. Double-blind trials are therefore not feasible, except under highly artificial conditions, for any treatment taking the form of a physician intervention requiring a skilled practitioner; whether the treatment is complementary or not is really a side issue. It is not the fact that a therapy is complementary that poses the difficulties, but that its nature is such that there is no easy equivalent to the inert tablets routinely used in drug trials.

Defining an appropriate placebo control

Placebo-controlled trials are certainly feasible both for herbal treatments and for homoeopathy, though they can be difficult if the treatment is individualized for each patient or, in the case of herbal treatments, in a bulky form. As with drugs it is relatively straightforward to produce inert pills identical in appearance to the true tablets. With treatments requiring a physical intervention (such as surgery or acupuncture) the definition of an appropriate placebo is problematic.

A great variety of control conditions have been used in acupuncture research[7] and in assessment of the manipulative therapies[36]. Many early acupuncture trials used 'sham acupuncture' as a control, in which needles were inserted at incorrect locations away from the classical acupuncture points. Researchers accepted without question the basic tenet of classical acupuncture that certain points were inert and others active[37]. It is now clear that such controls can lead to misinterpretation. Studies of the acupuncture treatment of back pain, for instance, show no difference between sham (non-classical) acupuncture and true acupuncture, but acupuncture has shown an advantage over a true placebo control. Acupuncture at non-classical sites cannot be assumed to be a placebo. This fundamental error has bedevilled the majority of controlled trials of acupuncture, and set research back by a decade[7]. So, while researchers need to understand the ideas underlying a complementary therapy, there can be dangers in importing them into the research design.

THE EFFICACY OF COMPLEMENTARY MEDICINE

CM has often been chastised for the paucity of supportive evidence and the low standard of much of the evaluative work. Many studies are indeed methodologically flawed. Poor design, inadequate measures and statistical analysis,

lack of follow-up data and substandard treatment are all too common[7,38]. However, deficiencies also abound in orthodox medical research[39–41]. The quality of medical information generally, and in particular the evidence for many clinical interventions, is quite poor. This is not to disparage the efforts being made or to detract from the importance of evaluating all forms of medical intervention, whether orthodox or complementary. Our point is only that the difference in the standards of evidence for orthodox and complementary therapies may not be as great as generally assumed.

Acupuncture

Richardson and Vincent's 1986 review[42] found good evidence for the short-term effectiveness of acupuncture for low-back pain, mixed results for headache, and some encouraging preliminary results for cervical pain and arthritis. The proportion of patients who were helped varied from study to study but commonly fell in the region 50–80%. In a later and larger review Ter Riet and colleagues[43] identified 51 controlled trials of acupuncture for chronic pain. Each study was scored on 18 methodological criteria, some weighted more heavily than others, with a maximum possible score of 100. Only 11 studies scored 50 or more points. Positive and negative results were approximately equally divided in the higher quality studies. The treatment for musculoskeletal problems of the spine (mostly low-back pain) showed the most positive results. Similar results are obtained when reviews are confined to studies with an acceptable placebo control[7]. Inconsistent evidence of efficacy was found in a review of 13 controlled trials of acupuncture for asthma[44]. Only 3 of 15 studies of acupuncture for smoking showed a positive result and there was little evidence that acupuncture was of benefit in the treatment of heroin addiction[45].

Manipulative therapies

Research on osteopathy and chiropractic therapies has, so far as randomized controlled trials are concerned, been largely limited to back and neck pain. Most trials compare a manipulative therapy with some simpler, cheaper therapy such as short-wave diathermy, massage or analgesics, though a few are comparisons of different manipulative techniques[36].

Confidence in the standard of the investigations seems to have increased gradually over the years[46–49]. The most comprehensive review of spinal manipulation[36] followed the same methods as Kleijnen in his review of homoeopathy. 35 randomized controlled trials were identified. No trial scored over 60 points out of a possible 100, though some of the standards are very difficult to attain. 30 trials concerned the treatment of back pain and 5 neck pain. In 18 trials (51%) the authors reported better results for spinal manipulation than for the comparison treatment, usually some form of basic standard treatment such as physiotherapy (short-wave diathermy, massage, exercises) or drugs (generally analgesics) or placebo. In 5 studies spinal manipulation was more effective in a subgroup of patients or only at certain times after the treatment ended. In 11 studies there was no difference between the spinal manipulation and the comparison treatment or the comparison treatment was superior. There was a tendency for trials with lower methodology scores to be more likely to report positive findings. 4 of 8 studies involving a placebo comparison, usually detuned short-wave diathermy, showed a significant advantage for manipulation.

Overall Koes and colleagues suggest that the results are promising but not conclusive. In their own trial of manipulation for back pain, in which they tried to avoid the methodological flaws identified in their review, manipulation showed a slight advantage over physiotherapy, and both were superior to placebo and general practitioner treatment. It is noteworthy that patients receiving manipulation needed only half as many treatments as those receiving physiotherapy.

Herbal remedies

Trials of acupuncture for chronic pain and manipulation for back pain can be sensibly reviewed together to produce an overall assessment of efficacy, even though the basic techniques used vary for individual patients and different conditions. In the case of herbalism and homoeopathy, a multitude of different remedies are targeted either singly or in combination at a wide variety of diseases. It is therefore not feasible to ask whether herbal therapy is or is not effective in some general sense. Individual herbal remedies must be evaluated in their own right and it is unlikely that any meaningful overall synthesis of results from scientific studies could be achieved.

Published work on the constituents, pharmacology, and effects of herbal medicine is vast. Many studies have been published on the effects of herbal treatment. Most are of poor standard, often with major methodological flaws[50], but there are several high-quality placebo-controlled trials for the efficacy of Chinese herbal therapy of atopic dermatitis in adults and atopic eczema in children[51], and of feverfew for migraine[52].

Few reviews or meta-analyses of herbal treatment seem to have been conducted, but in the case of *Ginkgo biloba* and garlic sufficient trials have been carried out to permit formal reviews. Kleijnen and Knipschild review 40 trials of ginkgo for cerebral insufficiency. Only 8 were of good quality; however, all but 1 of these 8 trials showed possible effects compared with placebo. The authors concluded that the

evidence is strong enough to recommend ginkgo for patients with mild to moderate cerebral insufficiency. Reviews by Silagy and Neil[54] and Warshafsky *et al.*[55] both concluded that garlic might decrease total serum cholesterol by about 9% but that further trials were necessary before it could be recommended for routine use. In a carefully conducted trial Neil and Silagy themselves were unable to detect any effect of garlic powder on cholesterol, but the meta-analysis continued to indicate some benefit when updated with these results[56].

Clearly, many herbs have therapeutic benefits either in their natural form or as sources for drugs. The conventional approach is to identify the active ingredients and produce them in a purer form. The herbalist, on the other hand, holds that the interaction of different herbs in their natural form produces, in the long term, superior therapeutic effects. The crucial question is whether this herbal approach has any advantage over a conventional pharmacological approach. Few, if any, studies have addressed this question.

Homoeopathy

There are two major reviews of trials of homoeopathy. In 1991 Kleijnen *et al.*[38] tracked down all known controlled trials of homoeopathy. A total of 107 controlled trials was identified, dealing with various different conditions. Overall the findings were positive: of the 105 trials with interpretable results 81 indicated positive results, and 24 trials had negative findings when homoeopathy was compared with (mostly placebo) controls. The methodology of many of these trials is, however, quite poor with 83 scoring 55 or below (out of 100) and only 16 scoring 60 or above. For instance, more than half the trials had fewer than 25 patients per group. Most worrying is the fact that in 42 trials there were insufficient data to check the authors' interpretation of the outcomes. Mindful of the fact that more positive findings can be associated with poorer methodology the authors separated out the best studies, those scoring at least 60/100. 10 of the best studies show an advantage for homoeopathy against 4 negative findings (and one that is inapplicable in that it was a comparison of homoeopathic treatments).

Linde and colleagues[57] identified 186 trials in total, selecting 89 that had adequate data for meta-analysis. This review differed from the Kleijnen approach in restricting trials to those that met certain methodological criteria and in assessing effect sizes for a true meta-analysis rather than simply a summary of positive and negative trials. The trials, however, covered a wide range of conditions and remedies (allergies, skin conditions, gastroenterological disorders, musculoskeletal complaints, neurological problems, gynaecological disorders, respiratory disorders, arthritis and others) so this inclusive strategy could be questioned on the grounds that the trials were too variable for a true meta-analysis. The analysis indicated that effect sizes for homoeopathy were larger than for placebo, both for all trials and for higher quality trials. The authors caution, however, that they found insufficient evidence that homoeopathy is clearly efficacious for any single clinical condition.

Both sets of reviewers consider that, notwithstanding the implausibility of homoeopathy, further research is warranted—both large scale trials, under rigorous double-blind conditions, and studies of possible mechanisms. Kleijnen *et al.*, avowed sceptics before their review, conclude by saying that 'we would be ready to accept that homoeopathy can be efficacious, if only the mechanism of action were more plausible'[38].

MECHANISMS OF ACTION

The mode of action of many herbs, even those studied in controlled trials, is often unknown, though a list of potentially active ingredients may have been identified. However, the idea that herbs could potentially produce therapeutic effects is not in itself contentious. Again, it is clearly plausible, even if one were to find the trial evidence unconvincing, that manipulation could relieve chronic pain. The position is less clear in the case of acupuncture. The discovery that acupuncture released endorphins and enkephalins certainly made it more plausible that acupuncture might be of value in the treatment of chronic pain and hastened its acceptance in pain clinics.

The plausibility of the postulated mechanism influences how one views the results of controlled trials—a problem that finds its clearest expression in the case of homoeopathy Kleijnen *et al.*[38] asked whether review articles of clinical evidence could only be convincing if there is a plausible mechanism of action. Should trial results be considered in isolation and taken on their own terms, or viewed as part of a more general attempt to understand the therapy in question? There seems no doubt that the evidence is stronger when some mechanism seems at least plausible even if, as in the case of many herbs, it cannot be identified.

In practical terms the question might be how long one is prepared to carry on with clinical trials, in an effort to resolve the issue of efficacy, before calling a halt to the process. As clinical evidence mounts, opinions may soften and (the logical consequence) the search for a mechanism then becomes imperative. Conversely, the question of mechanism will die should the larger trials not be supportive. However, it is also surely correct that any supportive experimental evidence, in the form of work on plant materials or animals, would greatly assist homoeopathy's case and lend considerable weight to the case for

funding of further clinical trials. The same arguments apply to other forms of CM, and indeed to therapies of all kinds.

ADVERSE EFFECTS OF COMPLEMENTARY MEDICINE

Complementary therapies appear, on the limited evidence available, to be remarkably safe. Orthodox treatment is associated with a much higher level of risk, though clearly this must always be offset against the benefits of treatment for serious or life-threatening illness[58–60]. Reports of adverse responses to the main complementary therapies, deterioration in the patient's condition, or actual injury are very rare. Little formal research has been conducted, however, the evidence consisting almost entirely of case reports.

For acupuncture, Rampes and James[61] reported a total of 216 instances of serious complications (such as pneumothorax) worldwide over a 20-year period—very low considering the large numbers of people receiving acupuncture. Infections from needles (mostly hepatitis) were the largest category, but are now of less concern since disposable needles are widely used. Patijn[62] reviewed 93 case reports of complications during manual therapy, involving a total of 129 cases. In 16 cases of vertebral artery injury the patient died and in a further 55 there were permanent neurological deficits. As with other complementary therapies, the rate of complications is impossible to ascertain, though it seems to be low. There are few reports on adverse reactions to herbal treatment, but there is certainly concern about the toxicity of some herbal preparations[63,64]. This generally relates to the purity of the product, rather than the herbs themselves. The particular risk of herbal preparations comes less from their inherent danger than from the belief that they are natural and therefore necessarily safe because they act in harmony with the body's own functions. There are almost no reports of direct adverse effects from homoeopathy or naturopathy.

There have also been reports of harm coming to patients of complementary practitioners through their avoidance of beneficial, perhaps life-saving, orthodox treatment[65]. In fact very few patients of complementary practitioners have turned away from orthodox treatment[1]. There may be a small number who eschew orthodox methods but how often this occurs and whether this is due to the influence of complementary practitioners is entirely unknown.

A RESEARCH AGENDA

The time is past when the major complementary therapies could be dismissed on the grounds that there was simply no evidence for them. Attempts to evaluate the major therapies are now thoroughgoing and serious, though there are major methodological flaws in many studies. We would say that the jury is still out as regards the overall value of most of the systems we have reviewed, though clearly evidence varies greatly according to the condition being treated and the therapy in question.

Several methodological issues remain to be resolved. Much larger trials are needed, which in turn require a much higher level of funding. The definition of an appropriate control group, certainly for acupuncture and the manipulative therapies, creates particular difficulties. Agreement on a standard methodology in regard to these issues would be of immense value. A further difficulty, at least for the CM community, is that, in the interests of standardization, few trials have allowed therapists to work as they would in actual practice, and this might be detrimental to the treatment's efficacy. Research designs could be flexible in this respect while still ensuring sufficient standardization on key issues (such as number and length of sessions) to ensure comparability between treatment groups. The lack of research expertise amongst complementary practitioners is also an obstacle[66,67] in that the main advocates of CM do not have the skills needed to attract funding and to conduct trials.

The use of single-case designs merits special consideration in the complementary field, because of their potential for examining efficacy with small patient numbers and their low cost. They allow an individual approach to each patient and are not generally disruptive of the clinical situation. A greater use of qualitative methods to allow a much deeper exploration of the subjective experience of patients and practitioners might find a particular resonance with complementary practitioners[4]. A greatly neglected area, but one with immense possibilities for research by complementary practitioners and organizations, is the study of the components of the therapeutic process itself. For instance, it would greatly enhance the validity of complementary therapies, and not necessarily threaten the overall enterprise, if the reliability and validity of some of the diagnostic techniques were examined[7].

There are also a range of questions to be addressed concerning the appeal of CM. Longitudinal research is needed to distinguish the reasons for beginning the treatment from the reasons for continuing it, and to assess the relative importance of the different factors[68]. A more sophisticated approach is needed to assessment of the knowledge, attitudes and beliefs of complementary patients, now that some initial differences between them and patients of family physicians have emerged, exploring the interrelations of the various characteristics in more complex analyses. In addition, the key elements of the consultation, especially touch and physical examination, should be monitored and related to satisfaction and other variables. The nature of the explanation provided by complementary practitioners may be an important part of their appeal if, for

some reason, their explanation is especially meaningful to the sick person, providing hope, comfort or legitimization of the illness.

Although complementary therapies seem remarkably safe, there is undoubtedly a need for serious audit of the nature and frequency of adverse responses to all forms of complementary medical treatment. Other more subtle potential adverse effects are in urgent need of research. These include the accusation that patients of complementary practitioners may be denied or dissuaded from having effective orthodox treatment. Surveys of complementary practitioners to ascertain what advice they give in relation to orthodox medicine would be a start, followed by surveys of patients to ascertain whether they have ever been actively persuaded not to have important orthodox treatment.

CONCLUSION

The dividing line between orthodox and complementary medicine will always be changing. Some complementary therapies are probably destined to remain permanently outside conventional scientifically based medicine. Others may gain acceptance and be no longer considered complementary, perhaps losing their unique character in the process. Acupuncture, for instance, is widely used in pain clinics, but not in its traditional form. The influence of CM, however, may be more pervasive and more important than any of its particular therapies. For many patients it represents a form of medicine that is more personal, less invasive and less risky, and which offers them more time and an opportunity to take an active part in their own treatment. Many forms of ill-health arise from lifestyle and require a different kind of medicine. Conventional medicine may have to become more complementary in method and in spirit, while not relinquishing its scientific base and its insistence on a critical evaluation of all forms of therapy.

REFERENCES

1 Thomas KJ, Carr J, Westlake L, Williams BT. Use of non-orthodox and conventional health care in Great Britain. *BMJ* 1991;**302**:207–10

2 British Medical Association. *Alternative Therapy*. Oxford: Oxford University Press, 1986

3 Pietroni PC. Alternative medicine. *Practitioner* 1986;**230**:1053–4

4 Vincent CA, Furnham AF. *Complementary Medicine. A Research Perspective*. Chichester: Wiley, 1997

5 Fulder S. *The Handbook of Complementary Medicine*, 3rd edn. Oxford: Oxford University Press, 1997

6 Micozzi MS, ed. *Fundamentals of Complementary and Alternative Medicine*. New York: Churchill Livingstone, 1996

7 Vincent CA. Acupuncture as a treatment for chronic pain. In: Lewith GT, Aldridge D, eds. *Clinical Research Methodology for Complementary Therapies*. London: Hodder and Stoughton, 1993: 289–308

8 Pietroni P. Holistic medicine: new lessons to be learned. *Practitioner* 1987;**231**:1386–90

9 Holohan TV. Referral by default. The medical community and unorthodox therapy. *JAMA* 1987;**257**:1641–2

10 Anderson E, Anderson P. General practitioners and alternative medicine. *J Roy Coll Gen Practit* 1987;**37**:52–5

11 Wharton R, Lewith G. Complementary medicine and the general practitioner. *BMJ* 1986;**292**:1498–1500

12 Marshall RJ, Gee R. The use of alternative therapies by Auckland general practitioners. *NZ Med J* 1990;**103**:213–15

13 Visser GJ, Peters L. Alternative medicine and general practitioners in The Netherlands: towards acceptance and integration. *Fam Pract* 1990;**7**:227–32

14 Wearn AM, Greenfield SM. Access to complementary medicine in general practice: survey in one UK health authority. *J R Soc Med* 1998;**91**:465–70

15 Pocock SJ. *Clinical Trials*. Chichester: John Wiley, 1993

16 Fisher P, Ward A. Complementary medicine in Europe. *BMJ* 1994;**309**:1070–11

17 Eisenberg D, Kessler RC, Foster C. Unconventional medicine in the United States. *N Engl J Med* 1993;**328**:246–52

18 Hand R. Alternative therapies used by patients with AIDS. *N Engl J Med* 1989;**320**:672–3

19 Greenblatt RM, Hollander H, McMaster JR, Henke CJ. Polypharmacy among patients attending an AIDS clinic: utilisation of prescribed, unorthodox, and investigational treatments. *J AIDS* 1991;**4**:136–43

20 Visser GJ, Peters L, Rasker JJ. Rheumatologists and their patients who seek alternative care: An agreement to disagree. *Br J Rheumatol* 1992;**31**:485–90

21 Boisset M, Fitzcharles M-A. Alternative medicine use by rheumatology patients in a universal health care setting. *J Rheumatol* 1994;**21**(1):148–152

22 Chandola A, Young Y, McAlister J, Axford J. Use of complementary medicine by patients attending musculoskeletal clinics. *J R Soc Med* 1999;**92**:13–15

23 Donnelly WJ, Spykerboer JE, Thong YH. Are patients who use alternative medicine dissatisfied with orthodox medicine? *Med J Aust* 1985;**142**:539–41

24 Smart HL, Mayberry JF, Atkinson M. Alternative medicine consultations and remedies in patients with the irritable bowel syndrome. *Gut* 1986;**27**:826–8

25 Cassileth BR, Lusk EJ, Strouse TB, Bodenheimer BJ. Contemporary unorthodox treatments in cancer medicine. *Ann Intern Med* 1984;**101**:105–12

26 McGinnis LS. Alternative therapies 1990. An overview. *Cancer* 1991;**67**(6 suppl):1788–92

27 Vincent C, Furnham A. Why do patients turn to complementary medicine? An empirical study. *Br J Clin Psychol* 1996;**35**:37–48

28 Vincent C, Furnham A, Willsmore M. The perceived efficacy of complementary and orthodox medicine in complementary and general practice patients. *Health Ed Res* 1995;**10**:395–405

29 Downer SM, Cody MM, McLuskey P, *et al*. Pursuit and practice of complementary therapies by cancer patients receiving conventional treatment. *BMJ* 1994;**309**:86–9

30 Heron J. Critique of conventional research methodology. *Comp Med Res* 1986;**1**:12–22

31 Kramer MS, Shapiro SH. Scientific challenges in the application of randomised trials. *JAMA* 1984;**252**:2739–45

32 Pollock AV. The rise and fall of the random controlled trial in surgery. *Theoret Surg* 1989;**4**:163–70

33 Canter D, Nanke L. Emerging priorities in complementary medical research. In: Lewith GT, Aldridge D, eds. *Clinical Research Methodology for Complementary Therapies*. London: Hodder & Stoughton, 1993:93–107

34 Lewith GT, Aldridge D. *Clinical Research Methodology for Complementary Therapies*. London: Hodder & Stoughton, 1993

35 Grisso JA. Making comparisons. *Lancet* 1993;**342**:157–60

36 Koes BW, Assendelft WJJ, van der Heijden GJMG, Bouter LM, Knipschild PG. Spinal manipulation and mobilisation for back and neck pain: a blinded review. *BMJ* 1991;**303**:1298–303

37 Vincent CA, Richardson PH. The evaluation of therapeutic acupuncture: concepts and methods. *Pain* 1986;**24**:1–13

38 Kleijnen J, Knipschild P, Ter Riet G. Clinical trials of homeopathy. *BMJ* 1991;**302**:316–23

39 Williamson JW, Goldschmidt PG, Colton T. The quality of medical literature: an analysis of validation assessments. In: Bautar JC, Mostellar R, eds. *Medical Use of Statistics*. Waltham, Mass.: NEJM Books, 1986:370–91

40 Sacks HS, Berrier J, Reitman D, Ancona BVA. Meta-analyses of randomised controlled trials. *N Engl J Med* 1987;**316**:450–5

41 Smith R. Where is the wisdom . . . ? *BMJ* 1991;**303**:798–9

42 Richardson PH, Vincent CA. Acupuncture for the treatment of pain: a review of evaluative research. *Pain* 1986;**24**:15–40

43 Ter Riet G, Kleijnen J, Knipschild P. Acupuncture and chronic pain: a criteria based meta-analysis. *J Clin Epidemiol* 1990;**11**:1191–9

44 Kleijnen J, Ter Riet G, Knipschild P. Acupuncture and asthma: a review of controlled trials. *Thorax* 1991;**46**:799–802

45 Ter Riet G, Kleijnen J, Knipschild P. A meta-analysis of studies into the effect of acupuncture on addiction. *Br J Gen Pract* 1990;**40**:379–82

46 Greenland S, Reisbord LS, Haldeman S, Buerger AA. Controlled clinical trials of manipulation: a review and a proposal. *J Occup Med* 1980;**22**:670

47 Brunarski DJ. Clinical trials of spinal manipulation: a critical appraisal and review of the literature. *J Manip Physiolog Therapy* 1984;**7**:243–9

48 DiFabio RP. Clinical assessment of manipulation and mobilization of the lumbar spine. *Physical Ther* 1986;**66**:51

49 Curtis P. Spinal manipulation: does it work? *Occup Med* 1988;**3**:31–44

50 Tsutani K. The evaluation of herbal medicines: an east Asian perspective. In: Lewith GT, Aldridge D, eds. *Clinical Research Methodology for Complementary Therapies*. London: Hodder & Stoughton, 1993:365–93

51 Sheehan MP, Rustin MHA, Atherton DJ, *et al*. Efficacy of traditional Chinese herbal therapy in adult atopic dermatitis. *Lancet* 1992;**340**:13–17

52 Murphy JJ, Heptinstall S, Mitchell JRA. Randomised double-blind placebo-controlled trial of feverfew in migraine prevention. *Lancet* 1988;ii:189–92

53 Kleijnen J, Knipschild P. Ginkgo biloba. *Lancet* 1992;**340**:1136–9

54 Silagy C, Neil A. Garlic as a lipid lowering agent—a meta-analysis. *J R Coll Physns* 1994;**28**:39–45

55 Warshafsky S, Kramer RS, Sivak SL. Effect of garlic on total serum cholesterol. A meta-analysis. *Ann Intern Med* 1993;**119**:599–605.

56 Neil HAW, Silagy CA, Lancaster T, *et al*. Garlic powder in the treatment of moderate hyperlipidaemia: a controlled trial and meta-analysis. *J R Coll Physns* 1996;**30**:329–34

57 Linde K, Clausius N, Ramirez G, *et al*. Are the clinical effects of homoeopathy placebo effects? A meta-analysis of placebo-controlled trials. *Lancet* 1997;**350**:834–43

58 Brennan TA, Leape LL, Laird NM, *et al*. Incidence of adverse events and negligence in hospitalised patients. *N Engl J Med* 1991;**324**:370–6

59 Einarson TR. Drug-related hospital admissions. *Ann Pharmacother* 1993;**27**:832–40

60 Vincent CA. Risk, safety and the dark side of quality. *BMJ* (in press)

61 Rampes H, James R. Complications of acupuncture. *Acup Med* 1995;**13**:26–33

62 Patijn J. Complications in manual medicine: a review of the literature. *J Manual Med* 1991;**6**:89–92

63 D'Arcy PF. Adverse reactions and interactions with herbal medicines. Part 1—adverse reactions. *Adverse Drug React Toxicol Rev* 1991;**10**:189–208

64 D'Arcy PF. Adverse reactions and interactions with herbal medicines. Part 2—drug interactions. *Adverse Drug React Toxicol Rev* 1993;**12**:147–62

65 Baum M. Bridging the gulf. *Comp Med Res* 1991;**5**:204–8

66 Tonkin RD. Role of research in the rapprochement between conventional medicine and complementary therapies: discussion paper. *J R Soc Med* 1987;**80**:361–3

67 Vincent C, Mole P. Acupuncturists and research. *Comp Med Res* 1987;**3**:25–31

68 Sharma U. *Complementary Medicine Today: Practitioners and Patients*. London: Routledge, 1992